REMARKS

Claims 1-49 are pending in the present application.

Claiming of Foreign Priority under 35 U.S.C. §119 (a)-(d) or (f)

The Applicants respectfully request that the Examiner correct the record with respect to the claiming of priority under 35 U.S.C. §119 (a)-(d) or (f). The Applicants have not claimed priority under 35 U.S.C. §119 (a)-(d) or (f). The Applicants claimed priority under 35 U.S.C. §119 (e).

I. Arguments with respect to Rejection under 35 U.S.C. §102(b) over Keller et al.

Claims 1, 6, 7, 10, 11, 14-18, 21-26, 28, 30-32, 35-40, 42, and 49 have been rejected under 35 U.S.C. §102(b) as being anticipated by Keller et al. (US-A-5,278,503). This rejection is respectfully traversed.

In formulating the rejection under 35 U.S.C. §102(b), the Examiner alleges that Keller et al. basically teaches a voltage compensation unit for reducing the effects of induced voltages upon a device to a safe level that includes a sensing circuit to sense voltages induced in conductive components of the device, wherein the voltages being induced by changing magnetic fields and a compensation circuit, operatively connected to the sensing circuit to provide opposing voltages to the device to reduce the effects of induced voltages caused by changing magnetic fields. This position by the Examiner is respectfully traversed.

A. Arguments with respect to Independent Claim 1

As set forth above, independent claim 1 recites a voltage compensation unit for reducing the effects of induced voltages upon a device to a safe level. The voltage compensation unit, as set forth by independent claim 1, includes a sensing circuit to sense voltages induced in conductive components of the device, the voltages being induced by changing magnetic fields, and a compensation circuit, operatively connected to the sensing circuit and responsive thereto, to provide opposing voltages to the device to reduce the effects of induced voltages caused by changing magnetic fields.

In contrast, Keller et al. teaches an apparatus for use with a superconducting magnet coil that compensates for interference caused by external time-varying magnetic fields. Keller et al. further teaches that the apparatus includes an induction coil wherein all the voltages induced in the coil are induced by the external magnetic fields. Keller et al. also teaches, contrary to the

Examiner's assertions, that a compensation coil generates compensation fields in the sample region so as to cancel the external magnetic field components in the sample region.

Keller et al. fails to teach a compensation circuit that provides opposing voltages to the device to reduce the effects of induced voltages caused by changing magnetic field, as set forth by independent claim 1. The use of a compensation circuit to generate compensation fields (magnetic fields) in the sample region so as to cancel the external magnetic field components in the sample region, as taught by Keller et al., fails to anticipate the providing of opposing voltages to a device to reduce the effects of induced voltages caused by changing magnetic field.

B. Arguments with respect to Independent Claim 10

As set forth above, independent claim 10 recites a voltage compensation unit for reducing the effects of induced voltages upon a tissue invasive medical tool to a safe level. The voltage compensation unit, as set forth by independent claim 10, includes a sensing circuit to sense voltages induced in conductive components of the medical tool, the voltages being induced by changing magnetic fields; a compensation circuit, operatively connected to the sensing circuit and responsive thereto, to provide opposing voltages to the medical tool to reduce the effects of induced voltages caused by changing magnetic fields; and a connection device to provide an electrical connection between the sensing circuit and the compensation circuit and the medical tool.

As noted above, in contrast, Keller et al. teaches an apparatus for use with a superconducting magnet coil that compensates for interference caused by external time-varying magnetic fields. Keller et al. further teaches that the apparatus includes an induction coil wherein all the voltages induced in the coil are induced by the external magnetic fields. Keller et al. also teaches, contrary to the Examiner's assertions, that a compensation coil generates compensation fields in the sample region so as to cancel the external magnetic field components in the sample region.

Keller et al. fails to teach a compensation circuit that provides opposing voltages to the medical tool to reduce the effects of induced voltages caused by changing magnetic field, as set forth by independent claim 10. The use of a compensation circuit to generate compensation fields (magnetic fields) in the sample region so as to cancel the external magnetic field components in the sample region, as taught by Keller et al., fails to anticipate the providing of opposing voltages to a medical tool to reduce the effects of induced voltages caused by changing magnetic field.

C. Arguments with respect to Independent Claim 16

As set forth above, amended independent claim 16 recites a voltage compensation unit for reducing the effects of induced voltages upon a device to a safe level. The voltage compensation unit, as set forth by amended independent claim 16, includes a communication circuit, communicatively linked to a MRI system, to receive, from the MRI system, information associated with a start and end of an application of changing magnetic fields produced by the MRI system; and a compensation circuit, operatively connected to the communication circuit and responsive thereto, to synchronize application of opposing voltages to the device with the start and end of the application of the changing magnetic fields produced by the MRI system, the opposing voltages reducing the effects of induced voltages caused by the changing magnetic fields.

As noted above, in contrast, Keller et al. teaches an apparatus for use with a superconducting magnet coil that compensates for interference caused by external time-varying magnetic fields. Keller et al. further teaches that the apparatus includes an induction coil wherein all the voltages induced in the coil are induced by the external magnetic fields. Keller et al. also teaches, contrary to the Examiner's assertions, that a compensation coil generates compensation fields in the sample region so as to cancel the external magnetic field components in the sample region.

Keller et al. fails to teach a compensation circuit that synchronizes the application of opposing voltages to the device with the start and end of the application of the changing magnetic fields produced by the MRI system wherein the opposing voltages reduce the effects of induced voltages caused by the changing magnetic fields, as set forth by amended independent claim 16. The use of a compensation circuit to generate compensation fields (magnetic fields) in the sample region so as to cancel the external magnetic field components in the sample region, as taught by Keller et al., fails to anticipate the synchronization of the application of opposing voltages to the device with the start and end of the application of the changing magnetic fields produced by the MRI system wherein the opposing voltages reduce the effects of induced voltages caused by the changing magnetic fields.

D. Arguments with respect to Independent Claim 30

As set forth above, amended independent claim 30 recites a voltage compensation unit for reducing the effects of induced voltages upon a device to a safe level. The voltage compensation unit, as set forth by amended independent claim 30, includes a communication circuit, communicatively linked to a MRI system, to receive, from the MRI system, information associated with a start and end of an application of changing magnetic fields produced by the MRI system; and a compensation circuit, operatively connected to the communication circuit and responsive thereto, to apply opposing voltages to the device, the opposing voltages reducing the effects of induced voltages caused by the changing magnetic fields.

As noted above, in contrast, Keller et al. teaches an apparatus for use with a superconducting magnet coil that compensates for interference caused by external time-varying magnetic fields. Keller et al. further teaches that the apparatus includes an induction coil wherein all the voltages induced in the coil are induced by the external magnetic fields. Keller et al. also teaches, contrary to the Examiner's assertions, that a compensation coil generates compensation fields in the sample region so as to cancel the external magnetic field components in the sample region.

Keller et al. fails to teach a compensation circuit that applies opposing voltages to the device, the opposing voltages reducing the effects of induced voltages caused by the changing magnetic fields, as set forth by amended independent claim 30. The use of a compensation circuit to generate compensation fields (magnetic fields) in the sample region so as to cancel the external magnetic field components in the sample region, as taught by Keller et al., fails to anticipate the application of opposing voltages to the device wherein the opposing voltages reduce the effects of induced voltages caused by the changing magnetic fields.

E. Arguments with respect to Dependent Claims 6, 7, 11, 14, 15, 17, 18, 21-26, 28, 31, 32, 35-40, 42, and 49

With respect to dependent claims 6, 7, 11, 14, 15, 17, 18, 21-26, 28, 31, 32, 35-40, 42, and 49, the Applicants, for the sake of brevity, will not address the reasons supporting patentability for each of these individual dependent claims, as these claims depend directly or indirectly from the various allowable independent claims for the reasons set forth above. The Applicant reserves the right to address the patentability of each of these dependent claims at a later time, should it be necessary.

Accordingly, in view of the remarks set forth above, the Examiner is respectfully requested to reconsider and withdraw this rejection under 35 U.S.C. §102(b).

II. Arguments with respect to Rejection under 35 U.S.C. §102(b) over Haragashira et al.

Claims 44-46 and 48 have been rejected under 35 U.S.C. §102(b) as being anticipated by Haragashira et al. (US-A-5,235,281). This rejection is respectfully traversed.

In formulating the rejection under 35 U.S.C. §102(b), the Examiner alleges that Haragashira et al. basically teaches a voltage compensation unit for reducing the effects of induced voltages upon a device having a single wire line connected to a balanced characteristic impedance including a tunable compensation circuit, operatively connected to the wire line to apply supplemental impedance to the wire line. The Examiner further alleges that Haragashira et al. teaches that the supplemental impedance causes the characteristic impedance of the wire line to become unbalanced, thereby reducing the effects of induced voltages caused by changing magnetic fields. This position by the Examiner is respectfully traversed.

As set forth above, amended independent claim 44 recites a voltage compensation unit for reducing the effects of induced voltages upon a device having a single wire line, the single wire line having a balanced characteristic impedance. The voltage compensation unit includes a tunable compensation circuit, operatively connected to the wire line, to apply variable supplemental impedance to the wire line. The variable supplemental impedance causes the characteristic impedance of the wire line to become unbalanced, thereby reducing the effects of induced voltages caused by changing magnetic fields.

Haragashira et al. teaches a magnetic resonance imaging system that generates a static magnetic field and generates a gradient field that is super-imposed upon the static field. Haragashira et al. further teaches that a device for canceling induced voltages in the gradient field coil. More specifically, Haragashira et al. teaches the use of a single coil to cancel the induced voltage. This single coil, as taught by Haragashira et al., does not provide variable supplemental impedance to the wire line. Thus, Haragashira et al. fails to teach that the cancellation of the induced voltages is achieved by applying variable supplemental impedance to the wire line.

With respect to dependent claims 45, 46, and 48, the Applicants, for the sake of brevity, will not address the reasons supporting patentability for each of these individual dependent claims, as these claims depend directly or indirectly from the various allowable independent

claims for the reasons set forth above. The Applicant reserves the right to address the patentability of each of these dependent claims at a later time, should it be necessary.

Accordingly, in view of the remarks set forth above, the Examiner is respectfully requested to reconsider and withdraw this rejection under 35 U.S.C. §102(b).

III. Arguments directed to Rejection under 35 U.S.C. §103

Claims 2, 3, 5, 15, 22, 23, 35-37, and 49 have been rejected under 35 U.S.C. §103 as being unpatentable over Keller et al. (US-A-5,278,503) in view of Haragashira et al. (US-A-5,235,281). This rejection is respectfully traversed.

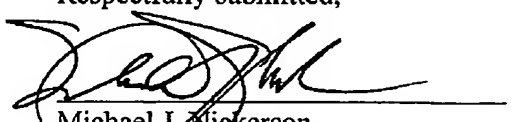
With respect to dependent claims 2, 3, 5, 15, 22, 23, 35-37, and 49, the Applicants, for the sake of brevity, will not address the reasons supporting patentability for each of these individual dependent claims, as these claims depend directly or indirectly from the various allowable independent claims for the reasons set forth above. The Applicant reserves the right to address the patentability of each of these dependent claims at a later time, should it be necessary.

Accordingly, in view of the remarks set forth above, the Examiner is respectfully requested to reconsider and withdraw this rejection under 35 U.S.C. §103.

CONCLUSION

Accordingly, in view of the amendments and all the reasons set forth above, the Examiner is respectfully requested to reconsider and withdraw all the present rejections. Also, an early indication of allowability is earnestly solicited.

Respectfully submitted,



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